

REMARKS

Claims 1-8, 11-13, 16-30 and 33-40 were examined and reported in the Office Action. Claims 1-8, 11-13, 16-30 and 33-40 are rejected. Claims 1, 7, 21, 23, 29 and 30 are amended. Claims 1-8, 11-13, 16-30, and 33-40 remain.

Applicant requests reconsideration of the application in view of the following remarks.

I. Double Patenting

It is asserted in the Office Action that claims 23, 24, 25, 26, 27, 28, 33, 34, 35 and 40 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over U.S. Patent No. 6,613,212 issued to Siebert et al. Terminal disclaimer complying with 37 CFR 3.73(b) is filed with this response to overcome the rejection.

Accordingly, withdrawal of the obviousness-type double patenting rejection for claims 23, 24, 25, 26, 27, 28, 33, 34, 35 and 40 are respectfully requested.

II. 35 U.S.C. §112

It is asserted in the Office Action that claims 1-8, 11-13, 16-30 and 33-40 are rejected under 35 U.S.C. §112, second paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicant has amended claims 1, 7, 21, 23 and 29 to overcome the 35 U.S.C. §112, second paragraph rejections.

Accordingly, withdrawal of the 35 U.S.C. §112, second paragraph rejections for claims 1-8, 11-13, 16-30 and 33-40 are respectfully requested.

III. 35 U.S.C. §102(a)

A. It is asserted in the Office Action that claims 1-7, 11, and 12 are rejected under 35 U.S.C. §102(a) as being anticipated by JP 10-019846A issued to Shimadzu, ("Shimadzu"). Applicant respectfully traverses the aforementioned rejection for the following reasons.

According to MPEP §2131, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.' (Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). 'The identical invention must be shown in as complete detail as is contained in the ... claim.' (Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)). The elements must be arranged as required by the claim, but this is not an ipsissimis verbis test, *i.e.*, identity of terminology is not required. (In re Bond, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990))."

Applicant's amended claim 1 contains the limitations of "[m]ulticapillary electrophoresis system comprising a plurality of juxtaposed capillaries, at least one source configured for the emission of a light beam intended to excite molecules lying in its path and inside the capillaries and means for detecting the fluorescence of the molecules excited by said light beam, wherein said means are arranged so as to detect light which emerges at the exit of said capillaries and which propagates along the direction in which said capillaries extend, the resolution of the detection means is high enough to distinguish light which emerges at the exit of each of the capillaries a first liquid is disposed outside of the capillaries, and a second liquid is disposed inside of the capillaries, the first liquid has a first refractive index and the second liquid has a second refractive index, wherein said first refractive index is equal to or superior to said second refractive index."

Shimadzu discloses a multicapillary electrophoresis apparatus where capillary tubes 1 are filled with gel. In Shimadzu, the ends of the capillary tubes are plunged into buffer tubs (2 and 3) containing buffer liquid (See [0004] of the computer translation). It

is asserted in the Office Action that Shimadzu discloses that “the first and second liquid are the same.” (Office Action, page 7). Applicant respectfully disagrees. Shimadzu does not indicate that the buffer liquid and the gel are identical. In fact, the composition of the gel contained in the capillary tubes and that of the buffer liquid are completely different. Therefore, the refractive index of the buffer liquid must be different from the refractive index of the gel. Typically, the gel contained in the capillary tubes comprises buffer solution, polymer and urea (urea is needed in order to denature DNA). And, the gel has a refractive index of about 1.38, whereas the pure buffer solution has a refractive index of about 1.33. Thus, the refractive index of the buffer solution contained in the buffer tubes 2 and 3 is inferior to the refractive index of the gel contained in capillary tubes 1. Therefore, in Shimadzu, the refractive index of the media outside of the capillaries is inferior to that of the medium inside of the capillaries. Thus, Shimadzu does not teach, disclose or suggest a “[m]ulticapillary electrophoresis system comprising a plurality of juxtaposed capillaries ... a first liquid is disposed outside of the capillaries, and a second liquid is disposed inside of the capillaries, the first liquid has a first refractive index and the second liquid has a second refractive index, wherein said first refractive index is equal to or superior to said second refractive index.”

Therefore, since Shimadzu does not disclose, teach or suggest all of Applicant’s amended claim 1 limitations, Applicant respectfully asserts that a *prima facie* rejection under 35 U.S.C. § 102(b) has not been adequately set forth relative to Shimadzu. Thus, Applicant’s amended claim 1 is not anticipated by Shimadzu. Additionally, the claims that directly or indirectly depend on claim 1, namely claims 2-7 and 11-12, are also not anticipated by Shimadzu for the same reason.

Accordingly, withdrawal of the 35 U.S.C. §102(a) rejections for claims 1-7, 11, and 12 are respectfully requested.

IV. 35 U.S.C. §103(a)

It is asserted in the Office Action that claims 8, 20 and 22 are rejected under 35 U.S.C. §103(a) as being unpatentable over Shimadzu. Applicant respectfully traverses the aforementioned rejection for the following reasons.

Applicant's claims 8, 20 and 22 either directly or indirectly depend on claim 1. In addition to the differences between Applicant's amended claim 1 and Shimadzu asserted above, Applicant submits the following.

According to MPEP §2142 "[t]o establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." (*In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)). Further, according to MPEP §2143.03, "[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. (*In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." "All words in a claim must be considered in judging the patentability of that claim against the prior art." (*In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970), emphasis added.)

Shimadzu discloses a multicapillary electrophoresis apparatus comprising a plurality of juxtaposed capillaries (1a), a source (20) for the emission of a beam (4) intended to excite samples inside the capillaries and a detector (7) for detecting the fluorescence of the samples excited by said beam. The detector (7) is arranged so as to detect the light which emerges at the exit of the capillaries (1a) and which propagates along the direction in which said capillaries extend. In Shimadzu, the capillary material has a high refractive index relative to the index of the media outside of the capillaries

and the medium inside the capillaries in order "to stop the outgoing radiation of the fluorescence from the capillary-tube side" (see Shimadzu, §[0009], lines 4 - 7).

Consequently, in the apparatus of Shimadzu, the fluorescent light emitted by the samples is totally reflected (see Shimadzu, abstract, §"Solution", lines 7-11) by the walls of a capillary and is conducted towards the exit of the capillary as illustrated on Figure 14a.

On the contrary, according to the limitations of Applicant's amended claim 1, the refractive index of the media outside of the capillaries is equal or superior to that of the medium inside of the capillaries. This not suggested, taught, or disclosed by Shimadzu. Applicant's claimed limitation aims at avoiding total reflection of the fluorescent light on the wall of the capillaries as indicated in the specification at page 13, line 36 to page 14, line 10. The effect of this limitation is illustrated on Figure 13: light transmitted through the walls of the capillaries is strongly deflected. This allows discrimination of light transmitted through the walls from light directly emitted by samples. This is not possible with the apparatus disclosed by Shimadzu.

Therefore, Shimadzu does not teach, disclose or suggest the limitations contained in Applicant's amended claim 1, as listed above. Since Shimadzu does not teach, disclose or suggest all the limitations of Applicant's amended claim 1, as listed above, there would not be any motivation to arrive at Applicant's claimed invention. Thus, Applicant's amended claim 1 is not obvious over Shimadzu in view of no other prior art since a *prima facie* case of obviousness has not been met under MPEP §2142. Additionally, the claims that directly or indirectly depend from amended claim 1, namely claims 8, 20, and 22, would also not be obvious over Shimadzu in view of no other prior art for the same reason.

Accordingly, withdrawal of the 35 U.S.C. §103(a) rejections for claims 8, 20 and 22 are respectfully requested.

B. It is asserted in the Office Action that claim 13 is rejected under 35 U.S.C. §103(a) as being unpatentable over Shimadzu in view of the Derwant abstract of Hitachi (JP03092756A). Applicant respectfully traverses the aforementioned rejection for the following reasons.

Applicant's claim 13 directly depends on amended claim 1. Applicant has addressed claim 1 regarding Shimadzu above in sections III and IV(A).

Hitachi is relied on for disclosing a fiber bundle interposed between the exits of the lanes of an electrophoresis cassette and detection device. (Office Action, page 14). Hitachi, however, does not teach, disclose or suggest "[m]ulticapillary electrophoresis system comprising a plurality of juxtaposed capillaries ... a first liquid is disposed outside of the capillaries, and a second liquid is disposed inside of the capillaries, the first liquid has a first refractive index and the second liquid has a second refractive index, wherein said first refractive index is equal to or superior to said second refractive index."

Neither Shimadzu, Hitachi, nor the combination of the two, teach, disclose or suggest the limitations contained in Applicant's amended claim 1, as listed above. Since neither Shimadzu, Hitachi, nor the combination of the two teach, disclose or suggest all the limitations of Applicant's amended claim 1, as listed above, there would not be any motivation to arrive at Applicant's claimed invention. Thus, Applicant's amended claim 1 is not obvious over Shimadzu in view of Hitachi since a *prima facie* case of obviousness has not been met under MPEP §2142. Additionally, the claim that directly depends from amended claim 1, namely claim 13, would also not be obvious over Shimadzu in view of Hitachi for the same reason.

Accordingly, withdrawal of the 35 U.S.C. §103(a) rejections for claim 13 is respectfully requested.

C. It is asserted in the Office Action that claims 16, 23-30, 33, 34, 38, and 40 are rejected under 35 U.S.C. §103(a) as being unpatentable over Shimadzu in view of U. S. Patent No. 5,290,587 issued to Young ("Young 1") and U. S. Patent No. 5,240,585 issued to Young et al. ("Young II"). Applicant respectfully traverses the aforementioned rejection for the following reasons.

Applicant's claim 16 depends on amended claim 1, which is addressed above in sections III and IV(A) regarding Shimadzu.

Applicant's amended claim 23 contains the limitations of "[a] multicapillary electrophoresis system comprising: a plurality of juxtaposed capillaries each having an entrance and an exit, at least one source configured for the emission of a light beam intended to excite molecules lying in its path and inside the plurality of juxtaposed capillaries and means for detecting the fluorescence of the molecules excited by said light beam, wherein said means are arranged so as to detect light which emerges at the exit of said plurality of juxtaposed capillaries and which propagates along a direction in which said plurality of juxtaposed capillaries extend, the resolution of the detection means is high enough to distinguish the light which emerges at the exit of each of the plurality of juxtaposed capillaries, and a portion of the outside of a wall of the capillaries between the impact of the excitation light beam and the exit of the capillaries extending to the end of the capillaries is blackened."

Shimadzu and Young I relate to different electrophoresis systems, which are incompatible for the following reasons. Shimadzu relates to an electrophoresis system that detects fluorescence of the molecules (see [0004] of the computer translation of Shimadzu). In contrast, Young I relates to an electrophoresis system that detects DNA molecules by their absorbance of incident laser light or by chemi-luminescence, refractive index or conductivity (see Young I, column 4, lines 49-54), but not fluorescence. Young II is only relied upon for disclosing "other embodiments with a detection portion in the capillary wall." (Office Action, page 15).

Young I further discloses applying a resistive coating to the exterior of the capillary tube. The coating disclosed in Young I prevents detecting fluorescence of the molecules, because such a coating contains polyimide (as indicated at column 3, lines 51-59, column 5, line 51-53), and polyimide is a fluorescent component. Therefore, if the coating disclosed in Young I is applied on the capillary tube of Shimadzu, laser light scattered by the capillary tube and received by the coating would cause the coating to emit fluorescent light. Consequently, the coating would create fluorescence all along the capillary tubes, which masks the fluorescent light emitted by the molecules from being detected. As a consequence, it would be impossible to distinguish fluorescent light emitted by the molecules from the fluorescent light generated by the coating. Therefore, a person skilled in the art would not apply the coating disclosed in Young I on the capillary tubes of Shimadzu, because such a coating would prevent the electrophoresis system of Shimadzu from working.

In Shimadzu, the material of the capillaries has a high refractive index relative to the index of the media outside of the capillaries and the medium inside the capillaries in order "to stop the outgoing radiation of the fluorescence from the capillary-tube side" (see Shimadzu § [0009], lines 4-7). Consequently, in the apparatus of Shimadzu, the fluorescent light emitted by the samples is totally reflected (see Shimadzu, abstract, § "Solution", lines 7-11) by the walls of a capillary and is conducted towards the exit of the capillary. That is why, the aim of Shimadzu is to have minimum light emerging through the wall of the capillaries and to have maximum light conducted towards the exit of the capillary. Therefore, it would be contradictory with the teaching of Shimadzu to cover the outside of the walls of the capillary with a coating as disclosed in Young I, because such a coating would modify the index of the media outside of the capillary and would therefore prevent having maximum light conducted towards the exit of the capillary. Covering the outside of the walls of the capillary with a coating as disclosed in Young I would be detrimental to the quantity of fluorescence light that could be detected by the detector.

Moreover, Shimadzu and Young I both fail to teach, disclose or suggest a multicapillary electrophoresis system wherein a portion of the outside of the wall of the capillaries extending between the impact of the excitation beam and the end of the capillaries and up to the end of the capillaries, is blackened. Further, as asserted in the Office Action Shimadzu does not disclose having a portion of the outside of the wall of the capillaries between the impact of the excitation beam and the end of the capillaries blackened. Young I discloses applying a resistive coating to the exterior of the capillary tube. In Young I, the coating is not necessarily black (see Young I, column 3, lines 55-58). The aim of the coating in Young I is not to absorb light but to create a high voltage drop across the exterior of the capillary tube. Further, the coating disclosed by Young I does not extend up to the end of the capillary tube.

Additionally, Young I teaches to remove the coating near the end of the capillary tube (see Young I, column 6, lines 13-17, column 8, lines 4-10). As illustrated in figure 1 of Young I, the inlet end 14 and the outlet end 16 of the capillary tube 12 are not covered with coating. Since the coating disclosed in Young I does not extend up to the end of the capillaries, the coating does not allow for elimination of all light trajectories other than those emerging from the molecules inside the capillaries. In Applicant's claimed invention, however, because of "a portion of the outside of a wall of the capillaries between the impact of the excitation light beam and the exit of the capillaries extending to the end of the capillaries is blackened," all light trajectories other than those emerging from the molecules inside the capillaries are eliminated by the blackened portion (see Applicant's specification, page 14, lines 15-28).

Neither Shimadzu, Young I, Young II, nor the combination of the three, teach, disclose or suggest the limitations contained in Applicant's amended claims 1 and 23, as listed above. Since neither Shimadzu, Young I, Young II, nor the combination of the three teach, disclose or suggest all the limitations of Applicant's amended claims 1 and 23, as listed above, there would not be any motivation to arrive at Applicant's claimed invention. Thus, Applicant's amended claims 1 and 23 are not obvious over Shimadzu in view of Young I and Young II since a *prima facie* case of obviousness has not been met under MPEP §2142. Additionally, the claims that directly or indirectly depend from

amended claims 1 and 23, namely claims 16, and 24-30, 33-34, 38 and 40, respectively, would also not be obvious over Shimadzu in view of Young I and Young II for the same reason.

Accordingly, withdrawal of the 35 U.S.C. §103(a) rejections for claims 16, 23-30, 33, 34, 38, and 40 are respectfully requested.

D. It is asserted in the Office Action that claims 17, 18, and 37 are rejected under 35 U.S.C. §103(a) as being unpatentable over Shimadzu in view of Young I and Young II, as applied to claims 16, 23-30, 33, 34, 38, and 40 above, and further in view of U. S. Patent No. 6,054,032 issued to Haddad et al. ("Haddad"). Applicant respectfully traverses the aforementioned rejection for the following reasons.

Applicant's claims 17-18 depend on amended claim 1. Applicant's claim 37 depends on amended claim 23. Applicant has addressed claims 1 and 23 regarding Shimadzu, Young I and Young II above in section IV(C).

Haddad is relied on for disclosing a support for a capillary array that holds the capillaries with glue. Haddad, however, does not teach, disclose or suggest a "[m]ulticapillary electrophoresis system comprising a plurality of juxtaposed capillaries ... a first liquid is disposed outside of the capillaries, and a second liquid is disposed inside of the capillaries, the first liquid has a first refractive index and the second liquid has a second refractive index, wherein said first refractive index is equal to or superior to said second refractive index" or "a portion of the outside of a wall of the capillaries between the impact of the excitation light beam and the exit of the capillaries extending to the end of the capillaries is blackened."

As asserted above in section IV(C), the combination of Shimadzu, Young I and Young II would not make sense as a person skilled in the art would not apply the coating disclosed in Young I on the capillary tubes of Shimadzu, because such a coating would prevent the electrophoresis system of Shimadzu from working.

Neither Shimadzu, Young I, Young II, Haddad, nor the combination of the four, teach, disclose or suggest the limitations contained in Applicant's amended claims 1 and 23, as listed above. Since neither Shimadzu, Young I, Young II, Haddad, nor the combination of the four teach, disclose or suggest all the limitations of Applicant's amended claims 1 and 23, as listed above, there would not be any motivation to arrive at Applicant's claimed invention. Thus, Applicant's amended claims 1 and 23 are not obvious over Shimadzu in view of Young I and Young II and further in view of Haddad since a *prima facie* case of obviousness has not been met under MPEP §2142. Additionally, the claims that directly or indirectly depend from amended claims 1 and 23, namely claims 17-18, and 37, respectively, would also not be obvious over Shimadzu in view of Young I and Young II for the same reason.

Accordingly, withdrawal of the 35 U.S.C. §103(a) rejections for claims 17, 18, and 37 are respectfully requested.

E. It is asserted in the Office Action that claim 35 is rejected under 35 U.S.C. §103(a) as being unpatentable over Shimadzu in view of Hitachi (JP03092756), Young I and Young II. Applicant respectfully traverses the aforementioned rejection for the following reasons.

Applicant's claim 35 is dependent on amended claim 23. As discussed above, neither Shimadzu, Hitachi, Young I, Young II, or any combination of the 4 teach, disclose or suggest the limitations of claim 23. In particular, neither Shimadzu, Hitachi, Young I, Young II teach, disclose or suggest "[a] multicapillary electrophoresis system comprising: a plurality of juxtaposed capillaries ... and a portion of the outside of a wall of the capillaries between the impact of the excitation light beam and the exit of the capillaries extending to the end of the capillaries is blackened."

Neither Shimadzu, Hitachi, Young I, Young II, nor the combination of the four, teach, disclose or suggest the limitations contained in Applicant's amended claim 23, as listed above. Since neither Shimadzu, Hitachi, Young I, Young II, nor the combination of the four teach, disclose or suggest all the limitations of Applicant's amended claim 23,

there would not be any motivation to arrive at Applicant's claimed invention. Thus, Applicant's amended claim 23 is not obvious over Shimadzu and Hitachi in view of Young I and Young II since a *prima facie* case of obviousness has not been met under MPEP §2142. Additionally, the claim that directly depends from amended claim 23, namely claim 35, would also not be obvious over Shimadzu and Hitachi in view of Young I and Young II for the same reason.

Accordingly, withdrawal of the 35 U.S.C. §103(a) rejection for claim 35 is respectfully requested.

V. Allowable Subject Matter

Applicant notes with appreciation the Examiner's assertion that claims 19, 21, 36, and 39 would be allowable if rewritten to overcome the rejections under 35 U.S.C. §112, 2nd paragraph, set forth in this Office Action and to include all of the limitations of the base claim and any intervening claims.

Applicant respectfully asserts that claims 1-8, 11-13, 16-30 and 33-40, as it now stands, are allowable for the reasons given above.

CONCLUSION

In view of the foregoing, it is believed that all claims now pending, namely 1-8, 11-13, 16-30 and 33-40, patentably define the subject invention over the prior art of record and are in condition for allowance and such action is earnestly solicited at the earliest possible date.

If necessary, the Commissioner is hereby authorized in this, concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§ 1.16, 1.17 or 1.20(d), particularly extension of time fees.

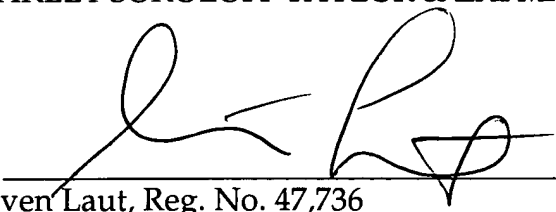
PETITION FOR EXTENSION OF TIME

Per 37 C.F.R. 1.136(a) and in connection with the Office Action mailed on November 10, 2004, Applicant respectfully petitions the Commissioner for a one (1) month extension of time, extending the period for response to March 10, 2005. The Commissioner is hereby authorized to charge payment to Deposit Account No. 02-2666 in the amount of \$120.00 to cover the petition filing fee for a 37 C.F.R. 1.17(a)(1) large entity. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

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Dated: March 10, 2005

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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, Post Office Box 1450, Alexandria, Virginia 22313-1450 on March 10, 2005.


Jean Svoboda